

Application No. 10/782,731
After Final Office Action of February 13, 2007

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Docket No.: 60893(70840)

REMARKS

In the Office Action dated February 13, 2007, claims 1-13 and 15-18 are pending, claims 1-13 and 15 are rejected and claims 16-18 are withdrawn from consideration. Reconsideration is requested for at least the reasons discussed hereinbelow.

Objection is made to the claims because of the spelling of the term "aligned." The above amendment corrects the spelling.

Objection is further made to claims 4 and 11 for being of improper dependent form; these claims have been cancelled in the above amendment.

Claims 1-6, 8-13 and 15 are rejected as being anticipated by Applicant's Admitted Prior Art (Figures 4 and 5A-5E; hereinafter "AAPA"). In the section Response to Arguments on page 7 of the present Office Action, the Examiner states that:

Applicant does briefly address the admitted prior art figure 4. Applicant argues the APA figure 4 depicts a device where the optical axis of the interlayer lens is not provided parallel to a central axis of the opening. This is not persuasive since the claims as currently presented do not require the optical axis and central axis be parallel, but merely to be 'aligned.'

Further, it is noted that the term 'aligned' does not necessitate a parallel arrangement, or that the axis be coextensive. Rather 'aligned' is broad enough to encompass one axis that is merely formed using the other axis, or formed to a certain offset from the other axis, or formed at a certain angle from the other axis.

Applicants have amended the claims to specifically point out that the central axis of the opening region is aligned with the interlayer lens such that the optical axis of the interlayer lens and the central axis of the opening region are parallel and matched. This amendment is consistent with the description of the invention in the specification. Support for the amendments to claims 1 and 12 can be found, e.g., in figure 2, and on page 31, lines 7-16 of original application or paragraph [0092] of US 2004/0183086 (the published application of the present original application), wherein the optical axis (E-E') of the interlayer lens is shown to match the central axis (D-D') of the corresponding opening 19X on the light receiving portion 12 (a

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line perpendicular to the semiconductor substrate 11 running through the center of the corresponding opening 19%). In other words, the optical axis of each of the interlayer lenses 21a is aligned with the central axis of the corresponding opening region 12x of the light receiving portion 12. Paragraph [0095] of US 2004/0183086 also discloses that "the optical axes of the interlayer lenses 21a are respectively parallel with the central axes of the opening regions 12x" (emphasis added).

The prior art fails to teach or suggest that the central axis of the opening region is aligned with the interlayer lens such that the optical axis of the interlayer lens and the central axis of the opening region are parallel and matched, as taught and claimed in the present application.

As shown in Figure 2, in the present invention, the optical axis (E-E') of the interlayer lens and the central axis (D-D') of the corresponding opening 19X on the light receiving portion 12 are shown to be parallel and matched. (also see, e.g., paragraphs [0092] and [0095] of US 2004/0183086).

To the contrary, the prior art as shown in Figures 4 and 5A-5E teaches as follows:

(a) In Figure 4, it is shown that "[t]he central line A-A' runs through the center C of each of the concaved portions on the surface of the first flattening film 110 ... The central axis B-B' runs through the central portion of the corresponding opening 109x above the light receiving portion 102. The central line A-A' is not aligned with the central axis B-B'. The center C" of the lens surface on the upper side of each of the interlayer lenses 111a is formed so as to aligned with the central axis B-B' running through the central axis of each of the openings 109x, i.e., that of each of the opening regions 102x' (emphasis added; please see, e.g., paragraph [0040] of US 2004/0183086);

(b) Therefore, the optical axis of each of the interlayer lenses 111a, i.e., the line connecting the center C of each of the lens surface on the lower side of each of the interlayer lenses 111a and the center C' of the lens surface on the upper side of each of the interlayer lenses 11a is not aligned with the central axis of the corresponding opening region 102x nor is it parallel thereto. As a result, the light converged by the interlayer

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lenses 111a does not pass through the openings 109x efficiently. The amount of light received by the light receiving portions 102 may decrease. The desirable light receiving sensitivity may not be obtained for the CCD solid-state pickup device 200 (see, e.g. paragraph [0041] of US 2004/0183086).

Therefore, as noted in points (a) and (b) above, Figures 4 and 5A-5E being cross-sectional views of the steps for fabricating the conventional CCD solid-state image pickup device 200 as shown in Figure 4), such a conventional device does not have an optical axis of each of the interlayer lenses that is aligned with the central axis of the corresponding opening region of the light receiving portion, so that said optical axis and said central axis are parallel and matched.

In fact, as noted in point (b) above, the optical axis of each interlayer lens 111a is not aligned with (i.e., not matched to) the central axis of the corresponding opening region 102x nor is it parallel thereto.

Thus, it is not seen how the present invention is anticipated by AAPA.

Claim 7 is rejected as being obvious over AAPA as applied to claims 1-6, 8-13, and 15 above, in view of JP 4-111354. JP 4-111354 fails to make up for the deficiencies of AAPA. JP 4-111354 also fails to teach or suggest that the central axis of the opening region is aligned with the interlayer lens such that the optical axis of the interlayer lens and the central axis of the opening region are parallel and matched, as taught and claimed in the present application.

Thus, it is not seen how the present invention would have been obvious to one of ordinary skill in the art in view of any combination of AAPA and JP 4-111354.

In view of the above discussion, Applicants respectfully submit that the pending application is in condition for allowance. An early reconsideration and notice of allowance are earnestly requested.

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If for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, the Commissioner is hereby authorized and requested to charge Deposit Account No. 04-1105.

Dated:

7 May '07

Respectfully submitted,

By 

George W. Neuner

Registration No.: 26,964

EDWARDS ANGELL PALMER & DODGE
LLP

P.O. Box 55874

Boston, Massachusetts 02205

(617) 517-5538

Attorneys/Agents For Applicant